

## APPENDIX C

GOALPOS .. SUM(I,A(I)\*MODELAA\*DT) =E=FINALPOS;

5 MODE1(ILAST) .. SUM(I,-A(I)\*MODELAA\*MODELb/(MODELb-  
MODELa)\*(EXP(-MODELa\*(T(ILAST)+DT-T(I))))  
-EXP(-MODELa\*(T(ILAST)-T(I)))) =E= 0.0;

MODE2(ILAST) .. SUM(I,A(I)\*MODELAA\*MODELa/(MODELb-  
MODELa)\*(EXP(-MODELb\*(T(ILAST)+DT-T(I))))  
-EXP(-MODELb\*(T(ILAST)-T(I)))) =E= 0.0;

10 DERIV1(J) .. 1000.0\*SUM(I,A(I)\*T(I)\*EXP(ZETA(J)\*W(J)\*T(I))\*  
SIN(WD(J)\*T(I))) =E= 0.0 ;

DERIV2(J) .. 1000.0\*SUM(I,A(I)\*T(I)\*EXP(ZETA(J)\*W(J)\*T(I))\*  
COS(WD(J)\*T(I))) =E= 0.0 ;

15 % MODELAA is the mechanical gain of the system, MODELb, and MODELa  
% are the two time constants of the system in radians. One time constant is  
% associated with the L/R rise time of the motor inductance and the other is  
% the mechanical time constant of the rigid system. The A(I) are the voltages %  
which need to be determined. The T(I) are the times for each of the A(I).

20 % DT is the time spacing of the outputs. W(J) are the undamped flexible  
% modes, WD(J) are the damped flexible modes (in radians/s).

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